The present location of the Smitsville Sewage Plant is also problematic, because it is restricting the future extension of the adjoining residential area (Smitsville) and can only service the Smitsville residential area because of restricting topography. The present sewage plant must therefore be relocated to be able to service the whole town of Barrydale, as well as future development of the town. The present treatment plant is also lacking capacity and need to be expanded significantly to comply too purification standards and to serve the entire urban area. The construction of a new treatment plant, correctly located with the required capacity and technical specifications, is therefore considered to be the preferred, sustainable and viable option. The planning for this project has been completed, and the project is considered a priority. A suitable site must still be determined and a complete environmental impact assessment must be undertaken.

Suurbraak – Nearly all houses (680 units) on the south side of the Buffeljags River have waterborne sewage. Presently all sewage gravitate to a pump station on the north-eastern edge of the town, from where it is being pumped to a sewage treatment plant which is located on the western edge of the town. The pumping system used, require maximum maintenance and must be considered a limiting factor in the effectiveness of the system and the management of capacity. The rising main connecting the pumping station and treatment plant is also inadequate and need to be upgraded.

The capacity and quality of the present treatment plant is currently inadequate and can not accommodate any future growth. Several alternatives are currently under investigation to address the problems experienced, including the relocation of the sewage treatment plant, to minimize the risk of future sewage spillages during mechanical breakdowns and power outages, and to improve operational effectiveness.

The erven to the north of the Buffeljags River in the town have not yet been provided with waterborne sewage and are making use of conservancy sewage tanks.

Buffeljagsrivier – All houses in the village of Buffeljagsrivier have waterborne sewage connections. The capacity of the present sewage treatment plant is sufficient to serve 400 houses. The location of the present treatment plant is limiting future development possibilities.

Infanta – No waterborne sewage system is used in the village. Sewage is dealt with by means of in-situ conservancy and septic sewage tanks. The replacement of the present sewage system is under investigation, because of the high risk of contaminating the ground water of the village. This problem is presently restricting further development of the village, and a solution is urgently required.

Malagas – No waterborne sewage system is used in the village. Sewage is dealt with by means of in-situ conservancy sewage tanks, septic sewage tanks and soak-away sanitation facilities. A sewage suction service is rendered by the Municipality of Swellendam. Serious concerns have been expressed on the negative impact that the present sewage system might have on the Breede River. The replacement of the present sewage system is currently under investigation.

Other rural areas – A sewage suction service is rendered for households and schools within the rural area. The projection is that this service will need to be extended in future, as the type of sanitation facilities used in the rural area are changed from soak away sewage facilities to conservancy sewage tanks and septic tanks.

4.1.2.3 Provision of electrical services infrastructure

Generated electricity is bought in all instances from Eskom, for further distribution in Swellendam, Barrydale and Suurbraak. Electrical distribution is undertaken by Eskom for all other villages and hamlets, and the rural area of the municipal area.

The limited ability of ESKOM to generate and distribute electricity is creating serious constraints for development. Power outages have become a common occurrence and vast amounts of money had to be invested in emergency power supplies and generators, to ensure general municipal service delivery in terms of water supply and sewage disposal.

As a result of the national electricity generation and distribution limitations, the Swellendam Municipality was also requested to implement energy saving measures. The following specific energy saving measures have been implemented in the municipal area:

- Electronic load control measures for geysers in Swellendam;
- The replacement of ordinary light bulbs with energy saving light bulbs; and
- Maximum electricity demand management measures for industrial electricity users.

The status of the provision of electrical infrastructure as key municipal service for the town and villages of Swellendam, Barrydale and Suurbraak are as follows:

Swellendam – The current and projected growth of the town of Swellendam is placing enormous strain on the current electricity network and supply. Considerable upgrading of networks and the bulk provision of electricity are therefore required as a matter of urgency. The completion of an electrical master plan confirmed the constraints, and various projects are presently undertaken to address the electrical infrastructural and supply constraints. The bulk electricity supply for Swellendam has recently been upgraded by ESKOM to 9.5 MvA to accommodate future growth and development.

Barrydale – The current Eskom electricity supply problem to the town of Barrydale, will soon be solved by a new 66 KVA main power supply line presently being installed. The internal electrical infrastructure is of sufficient standard.

Suurbraak – The current 500 KVA supply is insufficient for the electricity demand of the village. An application for the upgrade of the Eskom supply to Suurbraak has been submitted for consideration to Eskom. Presently many erven in Suurbraak can not be supplied with electricity, because of a limited electrical distribution network. The overhead 11 KVA/44 V distribution network of Suurbraak has also been badly planned and need corrections. Master planning for the supply of electricity in Suurbraak has been completed, and solutions for the already identified constraints and problems can now be determined for implementation.

4.1.2.4 Provision of storm water infrastructure

The current storm water systems or the lack thereof in buildup areas and towns within the municipal area, is considered to be problematic and present in many cases risks for residents.
The status of the provision of storm water infrastructure as key municipal service in towns, villages and hamlets of the municipal area are as follows:

Swellendam – All tarred municipal roads (80 %) in the town of Swellendam are provided with storm water management infrastructure. The 20 % un-tarred municipal streets have not been provided with storm water management infrastructure and problems are specifically experienced with storm water management in the involved areas. A storm water master plan for Swellendam has not yet been compiled. This situation is to be addressed as a matter of urgency, as to prevent the future occurrence of flooding of areas, with resulting flood damage to infrastructure at enormous capital costs.

Barrydale – No storm water management infrastructure presently exist for Barrydale. The absence of sufficient infrastructure is problematic, with resulting flooding of buildup areas and damage to property. Road bridges in the village are specifically vulnerable during severe weather conditions, because they are normally unsurpassable during floods.

Suurbraak – The tarred and un-tarred municipal streets in Suurbraak have not been provided with storm water infrastructure, with resulting problems experienced during severe weather conditions. Access to erven on the northern bank of the Buffeljags River is restricted during floods, because of access bridges being constantly flooded.

Buffeljagsrivier – Major problems are experienced during the raining season of the winter months, with storm water in the village of Buffeljagsrivier. No storm water infrastructure has been installed in the village. The problems experienced with storm water management are further aggravated, because most houses have been constructed at levels lower than street level, with the resulting general occurrence of flooding of houses.
The insufficient storm water infrastructure is causing the constant flooding of sewage pumping stations, with resulting spillage of sewage. To address afore-stated problems, certain amendments to operational systems have been implemented as temporary measures for problem solving. A total redesign of the system is required to address the identified problem permanently, which must be attended to in future budget cycles.

4.1.2.5 Provision of refuse removal services

The status of the provision of refuse removal services as key municipal service in the municipal area has been determined by an Integrated Waste Management Master Plan, which are to implemented pending funding sources. The afore-stated master planning will include aspects such as waste recycling, waste minimization, the extension of the Bontebok Landfill Site at Swellendam and the rehabilitation of redundant landfill sites.

Refuse removal are currently rendered in the towns, villages and hamlets of Swellendam, Barrydale, Suurbraak, Buffelsjagsrivier, Malagas and Infanta. A primary landfill site, the Bontebok Landfill Site is operated just outside Swellendam, which serves all the towns of the municipal area. The extent of the extension of the Bontebok landfill site needs to be investigated. This project has to be provided for as a future capital priority program in the IDP and budgets. Two secondary informal landfill sites are presently operated at Infanta and Malagas, which serves primarily as waste transfer stations. A formal landfill site is required for the areas of Malagas and Infanta, because the current facilities are not up to standard and sustainable. Refuse are sometimes conveyed over vast distances to the Bontebok Landfill Site, which pose specific challenges for the management of the refuse vehicle fleet.

Extensive processes are presently followed and studies must be undertaken, to ensure that waste disposal comply too environmental legislation. Opportunities for waste recycling and waste minimization have also been further investigated, as part of the integrated waste management process. The design of a pilot waste recycling project has been completed. A pilot project has been initiated, where after service providers will be appointed through supply chain processes.

4.1.2.6 Provision of cemeteries

Cemeteries are currently provided throughout the municipal area, with good access by all communities to cemeteries. A specific need exist for expansion opportunities for cemeteries in the municipal area. The extension of cemeteries needs to be handled in terms of national environmental management legislation, and budgetary allowances have therefore to be made to undertake environmental impact studies for afore-stated purpose. The process to extend the Railton Cemetery has been started.

A specific demand to provide a cemetery for Buffeljagsrivier has been identified. Because of the non-availability of municipal land to establish such a cemetery, extensive processes are currently followed to obtain state owned land for the purpose.

4.1.2.7 Provision of land use and building control services

Land use planning and building control as service are becoming increasingly important, as development demands for the municipal area becomes more relevant. The importance of spatial development, land use planning and building control as key municipal service, are also confirmed by the establishment of a dedicated organizational unit within the Swellendam Municipality as institution, to fulfill the associated functions.

Table 8: Land use planning applications.

Type of application	**2008 / 2009**				**2007 / 2008**			
	Received	**Approved**	**Withdrawn / Disapproved**	**Pending**	**Received**	**Approved**	**Withdrawn / Disapproved**	**Pending**
Subdivisions	31	18	6	7	43	28	6	9
Rezonings	18	12	4	2	10	8	2	0
Departures	46	31	6	9	32	21	8	3
Total	95	61	16	18	85	57	16	12

Most of the land use applications received where for the town of Swellendam, namely 48.4 % for 2008/2009 in relation to, 51.8 % for 2007 / 2008 and 67.1 % for 2006/2007, confirming the situation that economic activities within the municipal region, is predominately centered in die town of Swellendam. The second most applications were received for Barrydale, namely 11.6 % for 2008/2009 in relation to, 27.1 % for 2007 / 2008 and 14.8 % for 2006/2007. The available statistics also confirm that nearly 92 % of all development occurs in urban areas.

The approval rate for land use applications was on average for the two past years 66 %. Most non-approvals were for departure applications to operate sjebeens (suburban pubs selling liquor) and / or house shops from residential properties. Afore-stated uses for residential properties are not encouraged and is normally turned down, based on objections received. Incomplete applications were in most instances the cause for applications that could not be concluded, while the long periods required for the removal of restrictions on title deeds and to subdivide agricultural land, also restricted the conclusion of applications.

The performance standard set to conclude land use applications was 120 days, which was attained in more than 81 % of the applications.

Table 9: Building plan applications / approvals.

Applications received per town	2008 / 2009			2007 / 2008		
	Received	Approved	Pending	Received	Approved	Pending
Swellendam	120	111	9	158	144	14
Barrydale	11	10	1	24	18	6
Suurbraak	26	24	2	18	10	8
Malagas	17	14	3	11	5	6
Buffeljagsrivier	7	4	3	10	7	3
Infanta	9	8	1	10	10	0
Farming areas	4	3	1	0	0	0
Total	194	174	20	231	194	37

A decrease of 16.02 % was experienced for the year under review for building plan applications. This is by and large in line with the general economic situation in the area, and the increase in building plan applications for 2008 / 2009 and 2007/2008 can rather be attributed to an improved management system for building control and improved policing of unlawful building activities. Most of the building plan applications were received in the Swellendam municipal area, came from Swellendam itself (61.9 %), with the second most received from Suurbraak (13.4 %) and the third most received from Malagas.

The performance standard set to conclude building plan applications was 60 days, which was attained in more than 89.6 % of the applications, an improvement of 9.6 % on the previous year under review.

A Spatial Development Framework (SDF) for the Swellendam municipal area has been developed and adopted by Council. The intent is to refer this SDF to the Western Cape Provincial Government for adoption as structure plan for the municipal area. The intent of a SDF is to formulate strategic spatial based policy guidelines and proposals, whereby changes, needs and growth in a municipal area can be managed to the benefit of the environment and the residents.

The SDF as planning instrument is guided by realistic sets of goals and objectives, which are contextualized within the overall vision of the organization, as well as the broader context of the Overberg region and Western Cape Province. The finalization and adoption of the SDF for the municipal area resulted in the following advantages for the Swellendam Municipality:

- It ensures the adoption of a common spatial vision for orderly urban development in terms desired spatial patterns, with due cognizance of environmental conservation and bio-sphere planning and / or conservation;
- It informs broad land use management policy and serves as basis to objectively assess the acceptability of all land use planning applications;
- It informs the priorities for development and infrastructure projects in terms of spatial planning; and
- Strives to address "apartheid" planning by proving for spatial integration and encourages densification.

4.2 PROVISION OF FREE BASIC SERVICES

Local authorities annually receive a grant in aid from the National Treasury, called the equitable share. An equitable share allocation of R 9 552 992 has been received for the 2008/2009 financial year in relation to the R 7 330 711 that has been received for the 2007/2008 financial year. From the grant received, subsidies are allocated to the poor and indigent to assist them in affording basic municipal services, such as electricity, water, sanitation and refuse removal. A total of 1723 households (28.9 %) out of the 5956 residential households within the municipal area have been classified as destitute and received indigent assistance for the financial year, in terms of the indigent support policy of Council. The allocation of indigent support is revised annually in terms of a predetermined procedure.

Table 10: Allocation of Equitable Share

Allocation	2006/2007	2007/2008	2008/2009
Water supply	R 3 333 330	R 4 099 400	R 5 341 910
Electricity supply	R 891 681	R 1 077 411	R 1 404 360
Sanitation / Sewage	R 1 900 000	R 2 153 711	R 2 806 722
Total	R 6 180 011	R 7 330 711	R 9 552 992
Percentage growth	-	19 %	30 %

The policy for indigent support is also revised annually with the submission of budgets. The annual revision of the involved policy together with other financial policies, are a statutory requirement and is important to ensure proper assistance to the destitute and poor. A considerable larger amount of indigent support has been required for the year under review. This can in main be contributed to the economic recession and the associated loss in job opportunities and general economic conditions.

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Free basic services are provided presently in the following ways to the poor and the indigent within the Swellendam municipal area, as depicted in Tables 11 and 12:

Table 11: Provision of free basic services for electricity.

	Indigent households (Municipal supply)			Indigent households (Eskom supply)			Non-indigent households		
	Number of Households	Free units KWh	Rand value (R)	Number of households	Free units KWh	Rand value (R)	Number of households	Free Units KWh	Rand value (R)
06/07	1 420	50	R 135 980	218	50	R 25 483	4 102	20	R 392 808
07/08	1 341	50	R 450 576	218	50	R 73 248	4 215	20	R 553 587
08/09	1 505	50	R 689 711	218	50	R 99 905	4 232	20	R 775 776

Presently free electricity is also provided to all non-indigent households. The policy need to be revised in future, to ensure a more equitable system that focus on assistance to the poor, and for full legislative and grant compliance.

Table 12: Provision of free basic services for water.

	Indigent households			Non-indigent households		
	Number of households	Free units (KL)	Rand value (R)	Number of households	Free units (KL)	Rand value (R)
06/07	1 420	6	R 503 511	4 320	6	R 1 531 809
07/08	1559	6	R 460 665	4 215	6	R 1 297 783
08/09	1723	6	R 558 252	4 232	6	R 1 371 168

Six kiloliters of potable water are presently supplied to every household with a separate water meter. The reduction in the amount of beneficiaries (non-indigent households) in 2007/2008 was because free water was incorrectly allocated to businesses (residential properties with departures).

Pro rata subsidies are presently paid to indigent beneficiaries for sanitation and refuse removal. Subsidies vary from between ± R83 to ± R64 for sanitation. The difference in the subsidies paid to the indigent is because there is a difference in the actual tariff payable for sanitation for the town of Swellendam in relation to other towns. Allowances are also made for subsidization of bulk services. This subsidy principle will be revised in future, when the tariffs levied for sanitation services in the various towns are equalized.

A subsidy of R 61.00 is presently paid for refuse removal. Afore-stated subsidy principle will also be revised in future as tariffs are equalized.

4.3 MUNICIPAL BACKLOGS IN SERVICE DELIVERY

Various backlogs in municipal service delivery exist, which are set out in the following table per individual basic service delivered by the Municipality of Swellendam in the geographic area under jurisdiction of the Municipality. Infrastructural backlogs are a historical legacy, and the addressing thereof are currently receiving preferential budget allocation. There exist unfortunately various technical and practical reasons why all backlogs can not be addressed immediately, of which the main contributing factor is the lack of financial resources.

Table 13: Number of households that do not have access to basic infrastructure.

Type of service	2005/2006	2006/2007	2007/2008	2008/2009
Housing (Waiting list).	2 500	2 145	2295*	2320*
Water on site.	2 500	2 145	2295*	3100*
Access to sanitation (dependant on bucket system or non-existent).	2 570	2 180	2330 *	3135*
Access to refuse removal.	2 500	2 145	2295*	3100*
Electricity in house.	2 500	2 145	2295*	2250*

Note: The figures marked * are based on projections.

The indicated backlogs for municipal service delivery are present experienced in the various towns, villages and hamlets within the municipal area. Most of the service delivery backlogs (± 75 %) will be found in the town of Swellendam, because the town has the largest population within the municipal area.

The planned projects for sanitation service delivery and electricity service have been specifically intended for addressing backlogs. The addressing of specific service backlogs during the year under review has notwithstanding been limited, because infrastructure projects are presently being primarily focused on the provision of bulk municipal services and municipal service networks. A reduction in electrification backlogs have been achieved because of the electrification program for squatter camps.

Table 14: Number of households that gained access to municipal services for the past three financial years.

Type of service	2005/2006	2006/2007	2007/2008	2008/2009
Housing	100	235	0	30
Water	214	296	25	29
Sanitation	230	263	12	42
Refuse removal	217	263	0	32
Electricity	100	692	25	13

For purpose of addressing the identified service backlogs, capital resources have been allocated for each service in accordance with the needs and objectives identified in the IDP. The amounts spend in relation to the identified key municipal services are reflected in the following table.

Table 15: Percentage of capital budget allocated / expended for each key municipal service.

Financial Year	Housing	Water	Sanitation	Refuse Removal	Electricity	Streets / Storm water	Community Facilities
2005/2006	9 %	28 %	90 %	37 %	283 %	126 %	93 %
2006/2007	11 %	14 %	161 %	1 %	24 %	61 %	82 %
2007/2008	0 %	3 %	17 %	0 %	18 %	40 %	22 %
2008/2009	0 %	**100 %**	66 %	**0 %**	109 %	95%	58 %

4.4 MUNICIPAL INFRASTRUCTURE GRANT (MIG)

Municipal infrastructure grants are annually paid over to municipalities to finance infrastructure development, to address municipal infrastructure backlogs. Grant funding are paid out based on business plans submitted, approved and financed for projects. Grants are made specifically for projects for water service and sanitation service delivery.

The municipal infrastructure grant funding as set out in the table have been paid over to the Municipality of Swellendam for the 2005/2006, 2006/2007, 2007/2008 and 2008/2009 financial years. The grants received for the 2007/2008 and 2008/2009 financial years, were allocated to the upgrading of the Swellendam Sewage Purification Plant, but was only partially spent pending the completion of an environmental impact assessment for the project.

Table 16: Municipal Infrastructure Grants.

Financial Year	Available funding (R)	Amount spent (R)	Percentage spent
2005/2006	R 0	R 0	-
2006/2007	R 937 669	R 1 607 791	171.50 %
2007/2008	R 1 526 339	R 800 634	52.45 %
2008/2009	R13 398 907	R 7 434 020	55.50 %

4.5 HOUSING PROVISION

A Housing Master Plan has been adopted by the Municipal Council of Swellendam during May 2007. The approved master plan is based on the principle of establishing sustainable and integrated human settlements, with access to work opportunities, basic municipal services, a clean and healthy environment, education facilities (schools), social and medical facilities. The housing master plan does not only attend to the shortage of housing for the poor, but also make provision for housing development for middle income groups (so called GAP housing), with the intention of integrating communities and ensuring sustainable development.

A new housing waiting list has been compiled in close association with consultants appointed by the National Department of Housing, to audit and revise municipal housing waiting lists nationally. The new housing waiting list is based on data collected from door to door. The result of the revision was that the actual backlog for housing declined with a projected 14 %.

In terms of the afore-stated new housing list the housing backlog for the individual towns, villages and hamlets within the municipal area are now determined as follows:

Swellendam	:	1 689 units
Malagas	:	30 units
Buffeljagsrivier	:	265 units
Suurbraak	:	342 units
Barrydale	:	241 units
	Total	2 528 units

For purpose of addressing the identified housing backlog, 71 housing units are planned to be constructed in Swellendam in 2009/2010 as a first phase, while a further 224 housing units are to be build as soon as sewage purification capacity has been created and 200 erven are to be serviced for informal housing. The proposed housing project has been submitted and funded, but has been turned down by the Western Cape Provincial Housing Department on the grounds of insufficient bulk sewage capacity for Swellendam. The approval of future low cost housing projects in Swellendam as such, will therefore only be obtained if the enlargement of the Swellendam sewage purification facilities has been completed. An emergency housing project for 35 units in the Malagas rural area, to address the informal settlement located in the area, has been concluded. A GAP housing project has also been identified and tender documentation for the involved project is presently being prepared.

The availability of municipal services in Barrydale, Suurbraak and Buffeljagsrivier are presently restricting housing development projects in the involved villages. Land is available in all three instances for development.

For the year under review no housing units have been constructed for occupation by beneficiaries. All housing projects submitted for approval are pending, in spite of the situation that funding for the projects has already been source.

4.6 DISASTER MANAGEMENT AND RISK MITIGATION

Severe rain and wind storms have become a quite common occurrence in the Swellendam municipal area, as in the rest of the Western Cape and coastal areas of South Africa. With such storms, flooding normally occurs in all rivers and river flood plains, with resulting damage to municipal infrastructure and in most instances private property. With such storms the poor and destitute are predominantly vulnerable, and government interventions are continuously required to assist communities.

The government interventions are normally a co-ordinate effort from the local and district municipality, with assistance from the provincial government and provincial disaster center, and financial support by central government. Assistance required and rendered varies from incident tot incident. Because of the repeated occurrence of the type of disasters, fixed procedures and arrangements to address disasters have been instituted. The repair of damaged infrastructure, the rendering of assistance to affected communities and individuals and the implementation of risk mitigation strategies and systems have become part and parcel of municipal planning, and are now considered to be a key municipal service.

4.6.1 DISASTER INCIDENTS

A major incident occurred during November 2008, where a severe rainstorm caused widespread damage to infrastructure in most towns, within the Swellendam municipal area. Flooding occurred in all the rivers within the municipal area, with the Huis, Buffeljags, Koornlands and Klippe Rivers mostly affected. Serious damage to municipal infrastructure (specifically roads and bridges) and private property were caused. River banks and river beds were also eroded, giving rise to various secondary problems. Afore-stated disaster incident occurred, while the storm damage caused in December 2006, April / May 2007, and November 2007 by similar major storms, is still under repair.

4.6.2 MAGNITUDE OF INCIDENTS

Although formal studies on the occurrences have not been done, it is estimated that the involved incidents should be considered to be 50 years to 100 years storms. Aforesaid storms are considered to be major storms and municipal infrastructure, and specifically storm water systems, are not designed to accommodate such occurrences. For proper measurement of the intensity of the involved storms, strategically located weather stations needs to be installed in the municipal area, to measure rainfall and wind intensity for future planning.

4.6.3 DAMAGE AND IMPACT

Damage was caused to municipal infrastructure during the indicated storm of November 2008, and the recent storms of April / May 2007 and November 2007 (that must still be repaired). In terms of damage assessment reports, losses in terms of municipal infrastructure were estimated at R40 million for the indicated storms. Further costs were also incurred to clean areas after the individual storms, to render assistance to affected communities and individuals, and to get municipal service delivery up and running.

During the indicated storms, damages to municipal infrastructure are usually similar in nature and the following damages are normally registered:

- Water and sewage pipelines are washed away;
- Approaches to bridges are washed away;
- Irrigation water systems are washed away and clogged with debris;
- Storm water systems are washed away or damaged;
- River banks are eroded, giving rise to secondary problems.
- Gravel losses occur on surfaced roads;
- Potholes in surfaced roads rapidly forms, because of increased water penetration in the tarmac seals of roads; and
- All types of surfaces are eroded because of the extensive water flow.

The involved storms had a definite affect on the local economy, although the extent thereof can only be speculated on. Proper communication during such occurrences is of the outmost importance to ensure the prevention of conflicting communiqués and general disinformation.
Disaster events also has a substantial impact on the output of municipal service units, because staff and resources instead of being committed to specific service delivery, are now used for cleaning, rendering of disaster assistance, repair of damage and the implementation of mitigating measures.

4.6.4 MITIGATION MEASURES

The regular occurring major storms, resulting in flooding damage and to a lesser extend wind damage, necessitated a different approach in the planning and design of municipal infrastructure and the management of storm water. Various specific flood mitigation projects have therefore been introduced since the 2006 floods. These projects were in main concentrated in the built-up areas of the Koornlands and Buffeljags Rivers, and the storm water runoffs thereto.

The mitigation projects already implemented, only addresses some of the problem areas and much more need to be done. Funding for this type of risk mitigation projects, also need to be sourced from elsewhere, in order to put preventative measures in place to reduce future losses and associated costs of storm damages. Various mitigation measures can be implemented by a municipal authority to reduce risks and losses associated with storms, of which the following should be considered the most important:

4.6.4.1 River management

Proper river management is clearly a predominant risk mitigation measure. Large portions of river banks are unfortunately presently privately owned, resulting therein that proper river management practices are not being consistently applied. Damage occurring on private land must normally be repaired by the land owner. Land owners do not necessarily have the knowledge or resources to repair damage to river banks and river beds, and it is found that the non-repair of river banks and /or river beds, poor control of vegetation in rivers and the non-removal of debris from previous floods, contributes towards further damage with future flooding.

Dense vegetation in rivers does not only reduce the flow volume of a river, but also leads to blockages at structures (such as bridges) in rivers. It is therefore important to resolve on who must be responsible for the maintenance and management of a river and how it should be done, in order to mitigate the effects of future storms and flooding. A possible solution for this situation is that by-laws be passed for strict and regulatory river management. Alternatively the local municipality can take ownership of all rivers in built-up areas, as to allow for the holistic management of river areas and the resulting situation that proper risk mitigation measures are implemented continuously in all areas, with better protection of infrastructure and private property. All future actions in this regard, shall however be focused on the completion of detailed master planning for the management of every major river.

4.6.4.2 Storm water management

The inadequacy of storm water systems in built-up areas or the lack thereof, emphasize the urgent need for storm water master planning in all towns and urbanized areas. The need for storm water master planning has already been identified in the IDP and should receive priority for future budgets. Master planning must identify and prioritize the most urgent situations and projects, for future budgets.

4.6.4.3 Adaption of engineering designs

Engineering designs for civil and electrical infrastructure, needs to be adapted in future to be more resistant to storm conditions and flooding.